

CLAIMS

What is claimed is:

1. An assembly, comprising:
 - a heater to pre-heat an embossable film, disposed above a substrate, to an approximate embossing temperature;
 - a die assembly having an embossing foil to imprint the embossable film;and
 - a heat tunnel disposed between the heater and the die assembly to maintain the approximate embossing temperature.
2. The assembly of claim 1, further comprising a transporting device for the substrate.
3. The assembly of claim 2, wherein the transporting device comprises a vacuum chuck coupled to a robotic arm.
4. The assembly of claim 2, wherein the transporting device comprises a servo slide.
5. The assembly of claim 4, wherein the servo slide comprises:
 - a frame;
 - a holder plate to receive the disk substrate; and
 - at least two fingers to secure the disk substrate within the holder plate, the at least two fingers to maintain a precise position of the substrate.
6. The assembly of claim 1, wherein the die assembly comprises:
 - an elongated shaft with a tapered mandrel end portion to receive the substrate having a hole defined by an inner dimension edge of the substrate;
 - a ball bushing disposed around the elongated shaft; and

a ring portion disposed between the ball bushing and the embossing foil, wherein a thermal expansion to secure the ring portion to the embossing foil and to align a centerline of the embossing foil with a centerline of the substrate.

7. The assembly of claim 1, further comprising an gas actuation bladder coupled to the die assembly.
8. The assembly of claim 1, further comprising a vision device to inspect an imprint pattern on the substrate.
9. The assembly of claim 1, further comprising a cooling station disposed near the die assembly.
10. The assembly of claim 1, wherein the die assembly is used to imprint the embossable film for production of an optical recording disk.
11. The assembly of claim 1, wherein the die assembly is used to imprint the embossable film for production of a semiconductor device.
12. The assembly of claim 1, wherein the heat tunnel comprises an inductive heat tunnel.
13. The assembly of claim 1, wherein the heat tunnel comprises an IR heat tunnel.
14. The assembly of claim 1, wherein the substrate comprises a disk.
15. A method, comprising:
pre-heating an embossable film disposed above a substrate to approximately an embossing temperature; and

transporting the substrate through a heat tunnel to a die assembly to imprint an embossable film, the heat tunnel to maintain the embossing temperature.

16. The method of claim 15, further comprising centering the substrate relative to an embossing foil within the die assembly.

17. The method of claim 15, wherein pre-heating further comprises placing the substrate in an oven disposed adjacent to the die assembly.

18. The method of claim 15, wherein transporting further comprises picking up the substrate with a vacuum chuck coupled to a robotic arm disposed near the die assembly.

19. The method of claim 15, wherein transporting further comprises sliding the substrate through the heat tunnel with a servo slide.

20. The method of claim 19, further comprising centering the substrate relative to an embossing foil within the die assembly.

21. The method of claim 19, wherein transporting further comprises gripping the substrate with flexure joints.

22. The method of claim 16, wherein centering further comprises heating a ball bushing disposed within the die assembly to hold a precise alignment between the embossing foil and the substrate.

23. The method of claim 16, further comprising pressing the embossing foil into the embossable film of the substrate.

24. The method of claim 23, further comprising inspecting an embossed pattern on the embossable film.
25. The method of claim 23, wherein inspecting further comprises placing the substrate under a microscope to inspect an embossed pattern on the embossable film.
26. The method of claim 23, further comprising cooling the substrate.
27. An assembly, comprising:
 - means for pre-heating an embossable film disposed above a substrate to an approximate embossing temperature; and
 - means for transporting the substrate to an imprinting die assembly while maintaining the approximate embossing temperature.
28. The assembly of claim 27, further comprising:
 - means for centering the substrate relative to an embossing foil disposed within the imprinting die set.
29. The assembly of claim 27, further comprising means for inspecting an embossed pattern on the embossable film.
30. The assembly of claim 27, further comprising means for cooling the substrate.